

NORTH AMERICAN PANISCINI.

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INTRODUCTION.

The tribe Paniscini is rather a small one in this country, containing but two genera, and eleven species so far described. The external anatomy here given was prepared from our commonest species—*Paniscus geminatus* (Say)—added to by comparison in some respects with the corresponding structures in *Opheltes glaucopterus* (Linn). It was my intention when I commenced this paper to include a key to the species of *Paniscus*, but I have been unable to see specimens of all the species, and the entirely inadequate descriptions of several has made it impossible to prepare a key that would be strictly reliable. I have therefore included the original descriptions of the different species here, leaving it to others with better opportunities to prepare the key.

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EXTERNAL ANATOMY.

HEAD.

The head is of medium size and of the hypognathous type. It is slightly higher than broad, and when viewed from the front appears nearly circular in outline. From above, it appears slightly bi-concave; the anterior concavity being lost at the level of the insertion of the antennae and below them.

The compound eyes are large, extending from the top of the head to a point almost touching the base of the mandibles. Looking from the front these organs occupy half or slightly more than half of the front of the head; from the side view the eye takes up about two-thirds the width. The anterior margin of the eye, about one-third the distance from the top, is sharply excavated which is very noticeable. The antennae are inserted at the line of these two indentations or very near it. The lateral margins appear nearly straight. Above the point of concavity,

the eye which is elliptical in form extends toward the middle of the head, somewhat, thus making the distance between these organs at the vertex, a little less than at any other point.

The cheek, which lies behind the eye, is nearly uniform in width from the top to the base, and is only slightly narrower below where it extends slightly beneath the eye. The face in general is clothed with a short thick mat of sericeous pubescence.

CLYPEUS.

The clypeus, which is more or less irregular in outline, being rounded above (convex) and nearly straight along its free margin occupies about a third of the distance from the antennæ to the mandibles. On either side there is a projection, which extends just below the compound eyes, and about half way between the extremities of these projections and the dorsal edge of the clypeus are situated a pair of oval depressions, one on either side known as clypeal foveæ. The dorsal edge of the clypeus is marked by a transverse suture (or rather what was once apparently a suture, as there are no distinct sutures separating the clypeus from the frons) some little distance below the insertion of the antennæ. Between these there is quite a noticeable depression, the lower side of which is most pronounced.

FRONS.

The frons may be regarded as extending upward from the clypeus to the ocelli, with a downward extension on each side of the clypeus, where it appears to meet the cheek just below the eye. About two-thirds of the whole distance from the dorsal line of the clypeus to the ocelli, is the place of insertion of the antennæ. That portion of the frons, from the antennæ extending downward, projects in front of the level of the eye, while the portion above the antennæ is slightly sunken behind this level.

OCELLI.

The ocelli, which are of nearly equal size, are three in number, and are arranged to mark the corners of an equilateral triangle. The two lateral (posterior) ocelli nearly touch the compound eyes. An imaginary line passing through the posterior ocelli marks the vertex as treated in this paper. No sutures separating the vertex from the posterior portion of the head, above, or from the cheeks, behind the eyes, are present, and the limits of these parts are therefore somewhat indefinite.

The portion of the head, showing behind the compound eye, is termed the cheek, in this paper. The width of the cheek does not vary a great deal. The central portion, however, (that portion in the region of the attachment of the head to the thorax) is slightly wider than other parts.

LABRUM.

The labrum is attached to the lower, inner edge of the clypeus, leaving the outer edge of the clypeus well defined. In preserved specimens, the labrum is usually bent backward, at nearly right angles to the clypeus, with the mandibles closed over it, so that it is not accessible for study. For this reason, it has not seemed advisable to use it for analytical purposes.

MOUTH PARTS.

None of the mouth parts seem to be useful for the determination of the species and their description therefore is not included here. I might say, however, that possibly the mandibles, labial palpi, and maxillary palpi would be of use in the determination as in most of the insects examined, the palpi show to the full extent. Maxillary palpi five jointed, labial palpi four jointed.

The mandibles are somewhat curved, having two teeth, which are blackish to their bases. When the jaws are closed they overlap.

ANTENNÆ.

The antennæ are long. The basal portion of the bulb of the proximal segment or scape is rather small and articulates with the head in a socket. Its diameter, at this end, is about equal to its length to where it unites with the enlarged portion of the scape, but it is somewhat narrower toward the place where it enlarges into the scape proper. The bulb appears to be an entire segment, but this is not the generally accepted view. The scape which is the stoutest segment of the antennæ is somewhat smaller at its base, gradually increasing to the base of the next segment, the pedicel. This seems to extend down into the scape for some little distance. There is also a third segment before we come to the filament proper which is nearly twice as broad as long, and is called the ring joint. This seems to be rather unusual. The filament which consists of about fifty-four segments has those near the base a little longer than the others, gradually decreasing in length as we go towards its extremity.

THORAX.

The thorax in general is strongly compressed laterally, very finely pubescent, and is of a yellowish russet color.

PROTHORAX.

The prothorax, as seen from the side, is triangular in outline, marked by fine, distinct, oblique, transverse striations which are most noticeable near the lower anterior portion of the plate, while viewed from above it is a very narrow transverse band. Its anterior margin is straight and elevated, forming a flange, which projects slightly forward. Looking down from above, there can be easily detected with the aid of a microscope, a semicircular indentation or groove, which leads to the query, "Was this portion once a distinct plate representing a much reduced pronotum while the large triangular plate at the sides represented a much enlarged pro-pleuron?" It is set out very prominently from the mesethoracic plates by quite conspicuous sutures. The facial portion of the prothorax, lying just behind the head (episternum?) is somewhat hoof-shaped having a deeply impressed line extending from the point where the head joins the prothorax to a point near the insertion of the fore coxa, thus dividing it into right and left halves.

MESOTHORAX.

The mesonotum is a broad plate distinctly convex, lying between the fore-wings and extending forward to the dorsal portion of the prothorax. Starting near the anterior margin and at equal distances from the middle of the plates, are two lateral grooves known as the parapsidal furrows which curve slightly inward and extend nearly to the scutellum. These grooves become weak posteriorly, being only slightly noticeable after they have passed the middle of the plate. The anterior margin of this plate is bent slightly upward or reflexed, and this is continued around the sides as far back as the tegula, where it leaves the margin and becomes a distinct ridge which passes obliquely backward across the plate.

Directly behind the mesonotum already described, is the scutellum, the median portion of which is trapezoidal in outline, longer than broad, the longer base anterior, the shorter base being posterior and slightly over half the length of the former. Between the mesonotum and median portion of the scutellum

is a deep trough-like depression, whose ends are closed by a continuation backward onto the scutellum of the ridges, spoken of previously, which may be designated as the dorso-lateral ridges. On the mesonotum, just in front of the trough and branching off from the dorso-lateral ridge is a short oblique ridge which extends outward and forward to the insertion of the forewing. The sides of the trapezoid are continuations backward of the dorsal-lateral ridges. Near the rear margin of the scutellum these become lost. Along this margin there is a reflexed edge or flange which extends obliquely towards the insertion of the fore-wings.

The surface of the lateral portions of the scutellum lies at a sharp angle with that of the median portion (trapezoidal) and extends from the dorsal lateral ridge downward and forward to the base of the forewing. As already stated the hinder margin of this portion is reflexed nearly to the wing attachment. The mesothoracic pleuron is a large plate which lies below the wings, its posterior margin being approximately indicated by an oblique groove extending downward and backward from beneath the fore-wing to just beneath the hind wing where it bends a little more downward, and takes a nearly straight path to the meso-coxa. From here it passes forward, curving somewhat until about opposite the base of the fore coxa. It then turns sharply upward, and passing by the base of the fore-coxa follows along the edge of the prothorax to the base of the forewing.

There are several ridges and grooves on this plate, but nothing which can be termed a distinct suture, that is, dividing the pleuron into subordinate plates. The meso-coxa is attached near the extreme posterior edge of this plate, occupying about one-third of its width, which is somewhat greater ventrally than dorsally.

METATHORAX.

Just to the rear of the scutellum and below it is a narrow plate which extends from one hind wing to the other and is known as the post scutellum. The rear margin of this plate is reflexed as in the case of the rear margin of the scutellum, and extends forward nearly to the base of the hind wings.

The part of the metapleuron nearest the hind wing (episternum) is triangular in outline. The apex of the triangle extends ventrally and comes to a point just between the meso-

thoracic pleuron, and the metathoracic epimeron, while the base of the triangle lies dorsally below the furrow of the post scutellum.

The metathoracic epimeron is a large plate bordered on its dorsal side by the median segment, anteriorly by the metathoracic episternum above, and the mesothoracic pleuron below, while posteriorly it bears the coxa of the hind leg.

The median segment is a large arched plate distinctly striate above covering the area between the post scutellum, in front, and the petiole behind, and extending transversely from the metathoracic pleuron of one side to that of the other. A short distance behind the angle where the median segment, epimeron and episternum of the metathorax meet is an oval stigma on each side. Near the hinder margin of the plate, on each side, is a crescentic elevation, immediately behind which is a depression of the surface. Extending forward from this crescent to a point near which the median segment meets, the posterior dorsal angle of the metathoracic episternum is an elevated area, just below which is situated the dorsal edge of the stigma. This elevated area may be used for convenience as indicating the division between the dorsum and the sides of the median segment, though there is no evidence of a separation of these portions into separate plates.

At the extreme posterior end of the median segment there is a semi-circular carina which is quite prominent. The median segment is marked by fine, distinct, transverse striations and the metathorax, as a whole, is pubescent, and very finely punctured.

ABDOMEN.

This portion of the body has more or less of a russet brown color varying from a light yellowish brown, in some specimens, to a reddish brown, in others. The abdomen is composed of eight segments in both male and female, and is compressed laterally, more so ventrally than dorsally. The segments, as a general thing, decrease somewhat in length after the second one which is only about half as long as the first, but rapidly increasing in height up to the sixth inclusive, but the seventh and eighth are smaller.

The median segment has been included with the description of the metathorax. While it is undoubtedly the first segment of the abdomen, for convenience of description, we may consider

the segment, behind the thoracic mass, as a whole, as being the first segment. The first segment of the abdomen, counted in this way, is attached at the ventral side of the posterior end of the median segment. It is straight and nearly twice as long as the second segment. Just above its attachment to the median segment and below the dorsal portion of the posterior carina is a small but prominent muscle or funiculus, which is attached to the anterior dorsal portion of the ventral plate. A little in front of the middle of the segment, on each side, is an oval stigma, and situated about two-thirds the distance from the stigma to the posterior end of the thorax is an elliptical opening which, in some cases, apparently extends clear through the segment from side to side. On closer examination one will readily detect a thin membrane, stretched across this opening about in the middle of the body, separating it completely into right and left halves.

This opening is formed where the dorsal plate bends upward, and apparently leaves the ventral plate, only the thin membrane, already referred to, forming a connection between the two. It then turns downward and becomes closely connected with the ventral plate, again extending as narrow bands along the upper margins of the same plate nearly to the median segment. Viewed from above, the dorsal plate appears to divide just behind the funiculus, and extends as arms to the median segment, forming the lateral portions already described.

The ventral plate of the sixth segment is most prominent. From this portion of the sixth segment is protruded the ovipositor, and its palpi or feelers, which are hairy, except their basal portions which are concealed by the remaining segments. The ovipositor and feelers extend quite a distance beyond the extremity of the abdomen. On the eighth segment, a pair of cerci are situated at its extreme posterior margin, and approximately half way between the ventral and dorsal portions of this plate.

In the female the stigmata of the second and third segments are well in front of the middle, while the remainder are closer to the anterior margin, and none are perceptible on the last two segments. In the male the stigmata approach the anterior margins of the segments more and more passing backward, but they do not come close to it. On the seventh and eighth they appear to be absent.

The genitalia of the male protrude prominently between and beyond the last dorsal and ventral plates of the abdomen. The last segment in the males being noticeably shorter than the others, while in the females the last two are noticeably shorter.

All of the ventral segments of the abdomen are rather soft and membranous. The claspers are large and broad.

WINGS.

The wings are quite large and colorless, with the exception of a yellowish tinge, produced by the presence of reddish brown nerves and numerous short hairs, generally distributed over both the upper and under surfaces. Cresson's nomenclature of wings is the one used in this paper.

FORE WING.

Separating the marginal, or radial cell, from the median, or externo-medial cell, is a well-developed stigma, which is long, narrow and yellowish brown in color. It is considerably wider beyond its middle than before. The marginal or radial cell is lanceolate. The greater part of its anterior and longer side is formed by the costa and its remaining basal portion by the stigma. Posteriorly it is separated from the disco-cubital cell by the first abscissa of the radial nervure which runs from the stigma to the apex of the small triangular areolet. It is separated from the third submarginal cell by the second abscissa of the radial nervure, which is longer than the first, and is quite strongly bent at its origin where it forms approximately a right angle with the radial nervure. The median cell which is one of the largest of the wings is about four times as long as its greatest width. This latter dimension, occurring about three-fourths of the distance from the base of the wing to the outer end of the cell. It is separated from the sub-median cell posteriorly by the externo medial nervure and from the disco-cubital beyond by the basal nervure. The third side is formed by the costal and sub-costal nervures fused.

The costal cell is absent due to the fusing of the costal and sub-costal nervures, the sub-costal portion being however, more prominent than the costal. The disco-cubital cell which is probably the largest cell of the wing is irregular in outline, is bounded by five different nervures, namely, first abscissa of the radial, first transverse cubital, disco-cubital, discoidal and basal nervures, and a portion of the stigma.

Of the above, not mentioned before, the first transverse cubital separates this cell from the areolet. The disco-cubital nervure which separates it from the third discoidal cell has quite a prominent stump of a vein near its middle known as an abbreviated cubital nervure which extends into the cell. About half-way from this stump, to the triangular areolet is a short bulla. This cell is separated from the second discoidal cell by the discoidal nervure and receives but one recurrent nervure at the point where the disco-cubital and discoidal nervures meet. There is but one completely enclosed sub-marginal cell which is regarded as the second or areolet. It is small, approximately triangular and in all the specimens I have examined, the second transverse cubital nervure which separates this cell from the third sub-marginal cell has a bulla extending half way from the base to the apex of the triangle, beyond which the vein bends slightly, taking a straight line to the apex of the triangle.

The third sub-marginal cell is separated posteriorly from the second apical cell by the cubital nervure, and extends to the margin of the wing. Its other bounding lines have already been described. Submedian or internomedial cell is quite long and narrow, the externo-medial nervure separating it from the median in front, and the first abscissa of the anal nervure from the anal cell behind. Outwardly it is separated from the second discoidal cell by the transverse medial nervure which joins the externo-medial nervure just beyond the origin of the basal nervure, thus making it post fereal. The second discoidal cell is separated posteriorly from the anal cell by the second abscissa of the anal nervure which is about one-half the length of the first abscissa. Outwardly it is separated from the third discoidal cell anteriorly and first apical cell posteriorly by the first recurrent nervure, that portion of this nervure however separating it from the former is much shorter than the latter. The first recurrent nervure has a small bulla patch where it joins the margin of the wing. The third discoidal cell is separated posteriorly from the first apical cell by the first abscissa of the subdiscoidal nervure and outwardly from the second apical cell by the second recurrent nervure, at the center of which is a distinct bulla patch, while at its anterior extremity just below the areolet is another small bulla. The second apical cell is separated posteriorly from the first apical cell by the second abscissa of the sub-discoidal nervure which is much

shorter than the first abscessa, and extends to the margin of the wing. The anal cell is the longest cell of the wing. It is bounded, anteriorly, by the anal nervure and, posteriorly, by the margin of the wing which has a small fold near the extremity of the cell (frenal fold.) This cell extends to a point slightly beyond the outer end of the second discoidal cell. The first apical cell has already been described with the exception of mentioning that its posterior and outward boundary is formed by the margin of the wing.

HIND WING.

The costal cell is quite long extending somewhat over half the entire length of the wing, and it is, by far, the narrowest cell. It is separated, posteriorly, from the median cell, by the subcostal nervure. Anteriorly it is bordered by the costal nervure which extends somewhat less than half the length of the cell, and by the margin of the wing, which is a continuation of the latter. The marginal or radial cell is separated posteriorly from the median cell by the first abscessa of the marginal or radial nervure, and from the submarginal or cubital cell by the second abscessa of the same nervure. Its anterior and outward boundary is formed by the margin of the wing.

Six frenal hooks are found near the middle of the anterior margin of this cell. Submarginal or cubital cell is separated posteriorly from the discoidal cell by the second abscessa of the cubital nervure, inwardly from the median cell by the transverse cubital nervure, and extends outward to the margin of the wing. The median cell is the longest and largest cell of the wing. It is separated posteriorly from the submedian cell by the externo medial nervure and from the discoidal by the first abscessa of the cubital nervure. The submedian cell is separated posteriorly from the anal cell by the anal nervure and from the second discoidal cell by the first abscessa of the transverse medial nervure which is somewhat longer than the second abscessa, and forms with it approximately a right angle. Outwardly it is separated from the first discoidal cell by the second abscessa of the transverse medial nervure. The discoidal cell is separated posteriorly from the second discoidal by the discoidal nervure, and extends to the margin of the wing. Second discoidal cell is separated posteriorly and inwardly from the anal cell by the second abscessa of the anal nervure and extends to the margin of the wing.

TEGULÆ.

The tegula is a small chitinous plate, more or less triangular, with rounded corners, lying over the base of the fore wing. It is slightly sericeous, and to some degree arched.

LEGS.

The legs are quite long, rather slender, hairy, and all these segments beyond the femora are armed with spines to a greater or less degree. Coxa more or less bulb shaped. The two trochanters taken together are as long or a little longer than the coxa, and they are of about equal length in the hind leg, while in the middle and fore legs the outer segment is only about half the length of the other. Femur is second in length to the tibia, the longest segment, and in stoutness to the coxa which is the stoutest segment. The tibia is largest at its distal end. It is armed with spines above, below, and on the sides, these showing a partial arrangement into longitudinal rows. At its outer end where it joins the first tarsal segment is a circle of spines, two of which are much longer and stouter than the others in the posterior and middle legs, which are called tibial spurs. The inner spur is nearly twice as long as the outer one. These spines are clothed with hairs. The fore leg instead of bearing two tibial spurs has one long spur-like appendage nearly half as long as the segment, curved for about one-third of its length from the base to the extremity, bearing hairs on its inner surface which in connection with a corresponding modification at the base of the first tarsal segment acts as a cleaning apparatus.

There are five tarsal segments. The first is by far the longest, being about twice as long as the second, and three times as long as the third which is about as long as the fourth and fifth taken together. The fourth segment is slightly shorter than the fifth. The first three segments are armed with spines beneath, on the sides and at their outer ends. The fourth segment is the shortest tarsal segment, and is provided with spines at its end where it joins the base of the fifth and last segment. The fifth segment is not armed with spines except for a few long spine-like hairs at its extremity where the pair of well developed claws and a pulvillus between them occur. On the under side of the claw are borne about twenty teeth.

SEXUAL DISTINCTIONS.

Aside from the presence of a sting in the females and of more or less copulatory organs in the male, other differences may be noticed in the sexes. Ocelli seem to be closer together in the male, and also to the compound eyes than in the females. The male has fifty-seven segments in the antennæ, and the female fifty-eight, but it would seem probable, considering the large number of segments that this might vary somewhat.

TABLE OF GENERA.

Terminal teeth of mandibles longer than the inner; cheeks and temples not broad; scutellum more or less margined laterally; transverse median nervure distinctly postfurcal to the origin of the basal nervure.....PANISCUS Gravenhorst.

Teeth of mandibles equal in length; cheeks and temples broad; scutellum not margined laterally; transverse medial nervure interstitial with the origin of the basal nervure, rarely slightly postfurcal.....OPHELTES Holmgren.

DESCRIPTION OF SPECIES.

Opheltes glaucopterus (Linn). Description taken from Provancher.

Faune Entomologique Du Canada, II, 1883, p. 359.

Female—Length, 68 inch. Black variegated with red. Head varied with russet, except a black spot covering all the vertex and the back side of the head. Antennae russet, brown at the extremity, almost as long as the body. Thorax black; scales clear, a line before and another below, two lines on the back of the mesothorax, and its exterior borders, also sometimes the scutellum, all the legs with trochanters, the abdomen except the last three segments, of a yellowish russet color. Wings with the costa and the stigma yellow, the nervures brown; areola small, not petiolated, subtriangular; median nervure not appendiculate, arched. Metathorax bearing a little elevated canal in the middle, and a carinae on each side with another transversal at the apex, these carinae being elevated in the form of acute tubicles in certain spots. Hind part (hind coxae) russet black at the base.

Paniscus alaskensis, Ashm.

Proceedings of the Washington Academy of Sciences, IV, 1902. pp. 237-8.

Male—Length 10 mm. Head yellow, with purplish-brown eyes, and very much as in PANISCUS GEMINATUS Say, except that the ocelli are not placed on a black spot, and the lateral ocelli do not quite touch the eye margin, as in that species. The thorax and abdomen are pale honey-yellow; a stripe on sides of prosternum, the lateral margins of the mesonotum, and a stripe on the parapsidal furrows behind, are yellowish-white; the apical transverse carina is indicated only laterally, being wholly obliterated medially, the surface of the metanotum before it being very finely, transversely aciculate, behind it polished and impunctate. Wings hyaline, the venation as in P. GEMINATUS, the costal vein and the stigma yellow, the subcostal vein and the internal veins being brown or brown black. External claspers similar to those in P. GEMINATUS but slightly narrower.

Type—Cat. No. 5688, U. S. Nat. Museum. From Kukak Bay, July 4. Five specimens.

***Paniscus albotarsatus* Prov.**

Faune Entomologique Du Canada, II, 1883, p. 361.

Male—Length .40 inch. Beautiful yellow, face of a yellowish white, the ocelli black, contiguous with each other. Posterior tarsi white except at the base of the first segment; their claws (hooks) brown. Abdomen elongated, compressed; slightly arched, slim, scarcely tinged with brown at its extremity. Wings colorless, nerves brown; stigma yellow. Median nervure arched, without a rudiment of a nervure at its middle; areola subtriangular, very oblique, very small. G.

The color almost uniform, color of the species with its posterior tarsi which distinguishes it at first sight. In the female the abdomen is a little obscure towards the extremity, the ovipositor longer than the length of the abdomen.

***Paniscus albovarigatus*, Prov.**

Faune Entomologique Du Canada, II, 1883, p. 361.

Female—Length .38 inch. Uniform, honey-yellow; the face below and above the antennae, the orbites all around the eyes, a line on the edges of the mesothorax prolonged to the tip of the scutellum, two lines upon the back of the mesothorax, a line below the anterior wings, a large spot lower upon the flanks (sides) with another smaller one below the posterior wings, of a beautiful white. Ocelli not touching the eyes, and also distant from each other. Metathorax uniform (simple, even) obscurely transversely aciculate; areola of wings small, triangular, pedunculated, slightly oblique, abdomen convex, compressed from the third segment, brownish in its posterior half. AC.

***Paniscus geminatus* (Say).**

Faune Entomologique Du Canada, II, 1883 p. 360.

Female—Length .65 inch with a uniform yellowish russet tinge. Face a little clearer; ocelli contiguous with the eyes, and also with each other. Wings colorless, nerves black, stigma yellow. Median nervure strongly arched, with a rudiment of a nervure very apparent towards its middle. Metathorax pubescent, very finely punctured. Legs and posterior tarsi a little darker than the rest. Abdomen compressed, slightly convex, brownish at the extremity; ovipositor longer than the length of the abdomen. AC.

***Paniscus medius*, Ashm.**

Proceedings of the California Academy of Sciences, IV, 1891, p. 128.

Female—Length 12 mm.; ovip. 2 mm. Brownish-yellow; face and clypeus yellowish white; ocelli large, prominent, the lateral touching the eye; eyes distinctly emarginate within; thorax smooth, trilobed; metanotum smooth, without a vestige of carinae; wings hyaline, the costa and stigma brownish-yellow, the other nervures black, the discoidal nervure with a distinct stump of a vein; abdomen twice as long as the head and thorax united, strongly compressed, viewed from the side,

not much broadened towards apex; the petiole is a little more than one-third longer than the second segment, with the spiracles placed at two-fifths its length, the second segment is about two and one-half times as long as wide at apex.

Described from one specimen, from San Esteban (Haines).

This species resembles somewhat *P. texanus*, but is larger, differently colored, with a stump of a vein in the discoidal nervure, and with the segments of the abdomen relatively different.

***Paniscus melanostigma*, Cam.**

Biologia Centrali Americana; Hymenoptera, 1, 1886, p. 303.

Rufo-testaceous, mesonoto nigro; capite flavo; flagello antennarum fusco; alis hyalinis, stagmate nigro. Female.

Long. 15 millim.

Hab. Panama, Volcan de Chiriqui (Champion).

Face closely punctured; metathorax closely transversely striated. Areolet moderately large, straight, the recurrent nervure received a little beyond the middle; there is no branch on the cubital nervure.

Easily known from its allies by the black stigma and nervures. The petiole is longer compared to the second segment (the relative length of the two being as in *P. geminatus*) than in *P. tinctipennis*.

***Paniscus nigripectus*, Ashm.**

Proceedings of the United States National Museum, XII, 1889, p. 425.

Female—Length 16 mm. This species is much more closely allied to *P. geminatus* than is *P. texanus*, and structurally it is almost identical, but the mesonotum, mesopectus, stigma, and veins are black; the lateral ocelli touch the eye; the stump of the vein at the middle of the cubitus is wanting, and the submedian cell is only one-third the length of the transverse median nervure longer than the median cell; the second abdominal segment is two-thirds the length of the petiole, the spiracles situated at about one-third its length.

Habitat.—Texas.

Described from one specimen in Belfrage Collection.

***Paniscus ocellatus*, Vk.**

Proceedings Entomological Society of Washington, Vol. XI, 1909, p. 211.

Female—16 mm.; tegument pale castaneous to castaneous, orbital margin yellowish, tips of mandibles and edge of ocelli more or less blackish; wings faintly cloudy, transparent, stigma and costa pale, translucent, other veins mostly brownish or almost black; anterior ocellus elliptical, transverse, the shortest distance between the anterior ocellus and the nearest point on the eye; antennae 59-jointed, cylindrical, the joints well defined, the fifth to penultimate subequal and longer than wide at base, the apical joint rounded, subconical, a little longer

than the penultimate; discocubital vein with a trace of a stump, recurrent vein interstitial with the second transverse cubitus, areolet quadrangular, metathorax transversely wrinkled above and with a parenthesis-shaped carina on each side; abdomen shining and with a bloom-like pubescence that is conspicuous only in certain lights, the rest of the body very similarly pubescent, the pubescence pale, seemingly tinged with golden.

Male—Very like the female, but with a yellow face and 56-jointed antennae; male paratopotype with a distinct stump of a vein.

Type.—Female and male and paratopotype, No. 12320, U. S. National Museum.

Type locality.—Wellington, Kans., E. G. Kelley, collector, Webster, No. 5431, U. S. Department of Agriculture, Bureau of Entomology.

***Paniscus subfuscus*, Cress.**

Proceedings of the Entomological Society of Philadelphia, IV, 1865, p. 57.

Dull rufo-fuscous, legs and antennae paler; basal segments of abdomen piccous; wings hyaline.

Female—Dull rufo-fuscous, opaque; clypeus pale, pubescent; antennae as long as the body, slender, dull fulvous, slightly dusky at tips. Thorax with the dorsal lines deeply impressed; scutellum prominent, carinated on each side; metathorax minutely sculptured, incised at base, with a small acute tubercle on each side behind. Wings hyaline; nervures fuscous, stigma testaceous; areolet small, subpetiolated, oblique. Legs pale fuscous, the femora slightly dusky. Abdomen stout, arcuated, subcompressed, clothed with a very short, appressed, pale pubescence; 1st segment elongate, slightly broader at tip, with a faint tubercle on each side before the middle; 2nd segment about one-third shorter than the 1st; the three basal segments above, except the extreme base of the 1st, stained with piccous; apical margins of the remaining segments pale; ovipositor about as long as the 1st segment of the abdomen. Length 9 lines; expanse of wings 15 lines.

Collection.—Ent. Soc. Philad. One specimen.

This does not agree with the description of *P. Rufus* Brulle, which I have not seen, and which is said to inhabit Cuba.

***Paniscus texanus*, Ashm.**

Proceedings of the United States National Museum, XII, 1889, p. 125.

Female—Length 9 mm. This species has probably been confused in our collections with *P. geminatus* Say; but besides its much smaller size it can be readily separated by the following differences:

The third joint of the antennae is only slightly longer than the fourth; the mesonotum is smooth without parapsidal grooves; the lateral keels of the scutellum become delicate posteriorly; the spiracles of the petiole are placed just anterior to the middle; the second abdominal segment viewed from above is trapezoidal but slightly longer than wide

and only half the length of the petiole; the basal joint of hind tarsi only twice the length of the second; the submedian cell is as long or slightly longer than the median cell, the length of the transverse median nervure; while whereas, in *p. geminatus* there is always a distinct stump of a vein at the middle of the cubitus, in *P. texanus* it is entirely wanting or only the base remains.

Habitat.—Texas.

Described from one specimen in Belfrage Collection.

***Paniscus tinctipennis*, Cam.**

Biologia Centrali Americana; Hymenoptera, I, 1886, p. 303.

Fuscous, testaceo variegatus; capite flave; pedibus pallide testaceis, coxix posterioribus femoribusque posticis fuscis; alis fumatis, stigmatibus testaceo. Female, Long. 15 millim.

Hab. Panama. Volcan de Chiriqui 2000 to 3000 feet (Champion).

Antennae a little longer than the body, microscopically pilose; the flagellum dark fuscous, the scape testaceous. Head yellow, the occiput dark fuscous; the ocellar region black; the face obscurely punctured, projecting in the middle; mandibles testaceous, the tips black; palpi yellow. Thorax dark fuscous; a line on the pronotum, the sutures of the mesonotum, a mark below the tegulae, the sides of the scutellum, and the lower part of the metapleura, pale testaceous. Metathorax closely transversely striated. Abdomen fuscous, the base of the first three segments and their ventral surface pale testaceous. Wings with a fuscous tinge; areolet minute, not oblique; the recurrent nervure interstitial.

Differs from *P. geminatus* in the fuscous colour of the body in the wings having a decided smoky tinge, in the expansions on each side of the metathorax being much more distinct, in the abdomen being broader and not so compressed, and in the petiole being thicker and shorter compared to the second segment.

INDEX TO NOTES OF INTEREST ON *PANISCUS* NOT INCLUDED IN THIS PAPER.

1. Nuttall: *Insects and Disease*, p. 41, 1899.
2. Packard: *Text book of Entomology*, p. 517.
3. *Proceedings of the Entomological Society of Washington*, IV, pp. 45-47.
4. *The Canadian Entomologist*, XIX, p. 80.

INDEX TO LETTERING PLATES.

- a, anal cell.
- a₁, a₂, anal nervure (First and Second abscissas).
- ab, abdomen.
- ac, abbreviated cubital nervure.
- ap, first apical cell.
- ap₁, second apical cell.
- aw, anterior wing.
- b, bulb.
- bn, basal nervure.
- c, costal nervure.
- c₁, costal cell.
- cc, cerci.
- cf, clypeal foveae.
- cl, clypeus.
- cla, claspers.
- c + sc, costal and subcostal nervures blended.
- cu, cubital or submarginal cell.
- cu₁, cu₂, cubital nervure (First and Second abscissas).
- cu₁, cubital nervure.
- ex, exa.
- d, discoidal nervure.
- d₁, discoidal cell.
- d₂, second discoidal cell.
- d₃, third discoidal cell.
- de, disco-cubital nervure.
- de₁, disco-cubital cell.
- e, eye.
- em, externo-medial nervure.
- em₁, externo-medial or median cell.
- ep, triangular plate, Epimeron?
- epm, metathoracic epimeron.
- eps, metathoracic episternum.
- eps₁, hook-shaped plate, Episternum?
- f, funiculus.
- ff, frenal fold.
- im, interno-medial or submedian cell.
- m, marginal or radial cell.
- m₁, m₂, marginal or radial nervure. (First and Second abscissas).
- mc, median cell.
- md, mandible.
- mn, mesonotum.
- mp, mesothoracic pleuron.
- ms, median segment.
- ov, ovipositor.
- cc, cellus.
- p, parapsides.
- ped, pedicle.
- pn, pronotum.
- po, palpi of the ovipositor with tactile hairs.
- psct, postscutellum.
- pt, antennal pit.
- pw, posterior wing.
- r, ring joint.
- re₁, first recurrent nervure.
- re₂, second recurrent nervure.
- s, spiracle of median segment.
- sc, subcostal nervure.
- sd₁, sd₂, subdiscoidal nervure (First and Second abscissas).
- scp, scape.

set, scutellum.
sm, submedian cell.
sm₂, second submarginal cell or areolet.
sm₃, third submarginal cell.
sp, spiracle of abdomen.
st, stigma.
t, tegula.
tc, transverse cubital nervure.
tc₁, first transverse cubital nervure.
tc₂, second transverse cubital nervure.
tm, transverse medial nervure.
tm, tm₂, transverse medial nervure (First and Second abscissas).

EXPLANATION OF PLATES.

The following figures were drawn with the Camera Lucida.

PLATE XXIV.

- FIG. 1. Dorsal view of the thorax of *Paniscus geminatus*.
FIG. 2. Side view of the thorax of *Paniscus geminatus*.
FIG. 3. Anterior tibial comb of *Opheltes glaucopterus*.
FIG. 4. Anterior tibial comb of *Paniscus geminatus*.
FIG. 5. Side view of the anterior end of the first segment of the abdomen of *Paniscus geminatus*.
FIG. 6. Dorsal view of the anterior end of the first segment of the abdomen of *Paniscus geminatus*.

PLATE XXV.

- FIG. 7. Anterior wing of *Paniscus geminatus*.
FIG. 8. Posterior wing of *Paniscus geminatus*.
FIG. 9. Anterior wing of *Opheltes glaucopterus*.
FIG. 10. Posterior wing of *Opheltes glaucopterus*.

PLATE XXVI.

- FIG. 11. Posterior leg of *Paniscus geminatus*.
FIG. 12. Clypeus and labrum of *Paniscus geminatus*.
FIG. 13. Mandible of *Opheltes glaucopterus*.
FIG. 14. Mandible of *Paniscus geminatus*.

PLATE XXVII.

- FIG. 15. Front view of the head of *Paniscus geminatus*.
FIG. 16. Side view of the head of *Paniscus geminatus*.
FIG. 17. Maxillae and labium of *Paniscus geminatus*.

PLATE XXVIII.

- FIG. 18. Abdomen of *Paniscus geminatus* (female).
FIG. 19. Abdomen of *Paniscus geminatus* (male).
FIG. 20. Basal joints of the antenna of *Paniscus geminatus*.
FIG. 21. Claw of *Opheltes glaucopterus*.
FIG. 22. Claw of *Paniscus geminatus*.